FLOODING

Floods are among the most frequent and costly natural disaster in terms of human hardship and economic loss. There are several different types of likely flood events in Tennessee including flash, riverine, and urban stormwater. Regardless of the type of flood, the cause can almost always be attributed to excessive rainfall, either in the flood area or upstream reach.

The term "flash flood" describes localized floods of great volume and short duration. In contrast to riverine flooding, this type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the spring and summer.

Riverine floods result from precipitation over large areas. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include many independent river basins. The duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface areas due to urbanization.

Urban flood events result as land loses its ability to absorb rainfall as it is converted from fields or woodlands to roads, buildings, and parking lots. Urbanization increases runoff two to six times over what would occur on undeveloped terrain. During periods of urban flooding, streets can become swift moving rivers.

All flood events may result in upstream flooding due to downstream conditions such as channel restriction and/or high flow in a downstream confluence stream. This type of flooding is known as backwater flooding.

Major Sources of Flooding

The Cumberland River is the largest stream in Davidson County and serves as the eventual receiving stream for all surface runoff in the County. Local, state, and federal agencies have defined watersheds in the county in a number of ways in prior reports. There are 26 watersheds in Davidson County as defined by the National Pollutant Discharge Elimination System (NPDES) permit (see Table 4-4). Twenty-five watersheds represent tributaries to the Cumberland River and the 26th watershed represents the local inflow directly into the Cumberland River.

As part of the National Flood Insurance Program (NFIP), floodplains and floodways on many local streams have been established and are regulated by the local floodplain management ordinance. The most recent Flood Insurance Study (FIS) for Metro Nashville was published by FEMA in 2001. The FIS includes Flood Insurance Rate Maps (FIRM) that present the adopted floodplains, floodways, and flood profiles for streams in Davidson County. In preparation of the FIRMs, a total of 66 streams with combined lengths of approximately 250.95 miles were studied. Of this total, approximately 216.8 miles of streams were studied by detailed methods (see Table 4-4).

Table 4-4. Major Sources of Flooding

WATERSHED	CONTRIBUTING DRAINAGE AREA (sq.mi.)	STREAMS STUDIED BY DETAILED METHOD
Back Creek	2.6	
Browns Creek	16.7	• Browns Creek (4.27 mi.) • Middle Fork Browns Creek (1.14 mi.) • West Fork Browns Creek (2.62 mi.)
Bull Run	4.0	
Cooper Creek	4.9	
Cub Creek	2.5	
Davidson Branch	3.8	
Dry Creek	9.2	• Dry Creek (2.65 mi.)
Gibson Creek	4.4	• Gibson Creek (1.83 mi.) • Gibson Creek Tributary (1.05 mi.)
Gizzard Branch	1.7	
Harpeth River	57.3	• Buffalo Creek (2.25 mi.) • Flat Creek (3.07 mi.) • Harpeth River (15.3 mi.) • Little Harpeth River (2.4 mi.) • South Harpeth River (5.5 mi.) • Trace Creek (0.92 mi.) • Windemere Branch (1.16 mi.)
Indian Creek	5.8	
Island Creek	1.0	
Loves Branch	2.3	
Mansker Creek	21.5	• Mansker Creek (7.61 mi.)
Marrowbone Creek	19.4	
Mill Creek	72.3	• Collins Creek (1.12 mi.) • Mill Creek (20.3 mi.) • Mill Creek - Tributary A (2.15 mi.) • Mill Creek - Tributary B (0.93 mi.) • Mill Creek - Tributary 1 (0.81 mi.) • Sevenmile Creek (4.72 mi.) • Sims Branch (1.82 mi.) • Sorghum Branch (2.63 mi.) • Whittemore Branch (3.02 mi.)
Overall Creek	8.0	• Overall Creek (2.22 mi.) • Overall Creek - Tributary 1 (0.81 mi.)

Table 4-4. Major Sources of Flooding (continued)

WATERSHED	CONTRIBUTING DRAINAGE AREA (sq.mi.)	STREAMS STUDIED BY DETAILED METHOD
Pages Branch	3.2	• Pages Branch (2.41 mi.) • Pages Branch - Tributary A (1.02 mi.) • Pages Branch - Tributary B (0.78 mi.)
Pond Creek	2.5	
Richland Creek	28.5	• Jocelyn Hollow Branch (1.14 mi.) • Richland Creek (5.78 mi.) • Sugartree Creek (3.45 mi.) • Vaughns Gap Branch (1.90 mi.)
Sandy Creek	0.7	
Stones River	78.9	• East Fork Hamilton Creek (1.16 mi.) • East Fork Hamilton Creek - Tributary 1 (0.48 mi.) • Hurricane Creek (2.38 mi.) • West Branch Hurricane Creek (0.71 mi.) • McCrory Creek (3.51 mi.) • Scotts Creek (1.32 mi.) • Scotts Hollow (0.88 mi.) • Stoners Creek (5.60 mi.) • Stones River (6.50 mi.)
Sulpher Creek	6.0	
Sycamore Creek	21.7	
Whites Creek	63.8	• Drakes Branch (1.43 mi.) • Earthman Fork (0.48 mi.) • Eaton Creek (2.92 mi.) • Ewing Creek (4.12 mi.) • Little Creek (2.61 mi.) • North Fork Ewing Creek (2.92 mi.) • Vhoins Branch (1.10 mi.) • Whites Creek (12.6 mi.)

All streams within Metro Nashville, identified in Table 4-4, are subject to flooding and backwater flooding is significant. The primary effect of flooding on these streams appears to be inundation with water, although higher water velocities become significant to persons and structures under more extreme flooding situations. Calculated floodplain velocities range from 1.0 to 5.0 feet per second (fps), which is considered to be dangerous magnitude. The following table outlines the critical depths and velocities that will harm residents and structures during a flood event.

Table 4-5. Critical Flood Depths and Velocities

Depth (threat to life)	In stagnant backwater areas (zero velocity), depths in excess of about 1m (3.3ft) are sufficient to float young children, and depths above 1.4m (4.6ft) are sufficient to float teenage children and many adults.
Velocity (threat to life)	In shallow areas, velocities in excess of 1.8m/s (5.9 ft/s) pose a threat to the stability of many individuals.
Depth and Velocity (threat to life)	The hazards of depth and velocity are closely linked as they combine to effect instability through an upward buoyant force and a lateral force. A product of less than or equal to $0.4m^2/s$ ($43\ ft^2/s$) defines a low hazard provided the depth does not exceed 0.8m (2.6ft) and the velocity does not exceed 1.7m/s (5.6 ft/s).
Vehicular access (emergency access)	Most automobiles will be halted by flood depths above 0.3-0.5m (1.0-1.7ft). A maximum flood velocity of 3m/s (9.8 ft/s) would be permissible, providing that flood depths are less than 0.3m (1.0ft). A depth of 0.9-1.2m (2.9-3.9 ft) is the maximum depth for rapid access of large emergency vehicles.
Structural Integrity (structures above ground)	A depth of 0.8m (2.6ft) is the safe upper limit for the above ground/super structure of conventional brick veneer, and certain types of concrete block buildings. The structural integrity of elevated structures is more a function of flood velocities (e.g. Erosion of foundations, footings or fill) than depth. The maximum velocity to maintain structural stability depends on soil type, vegetation cover, and slope but ranges between 0.8-1.5m/s (2.6-4.9 ft/s)
Fill (stability)	In general, fill may become susceptible to erosion/instability at depths of 1.8-2.4m (5.9-7.9ft).

D R A F T

Identified Problem Areas

The streams throughout Davidson County, as previously identified, experience flooding during extreme rainfall events. The Metropolitan Government of Nashville and Davidson County and the Nashville District of United States Army Corps of Engineers have documented potential flood damages countywide in numerous studies.

A number of documents have been reviewed for this plan, which were prepared by or for the Metropolitan Department of Public Works (MDPW) and the U.S. Army Corps of Engineers (USACE), Nashville District. MDPW documents consist of basin plans for streams located within Davidson County: Browns Creek, including West and Middle Forks; Cooper Creek; East Fork Hamilton Creek; Gibson Creek; McCrory Creek; Sorghum Branch, Sevenmile Creek, and Tributary 1 of Mill Creek; Pages Branch; Richland Creek; Scotts Creek; Sugartree Creek; Whites Creek; and Whittemore Branch. Each basin plan provides a detailed description of the watershed drainage area and associated hydrologic and hydraulic parameters, existing and predicted future flooding problems within the watershed, and alternative solutions for reducing flooding problems. USACE documents consist of a variety of reconnaissance reports, feasibility reports, and detailed project reports for select streams within Davidson County.

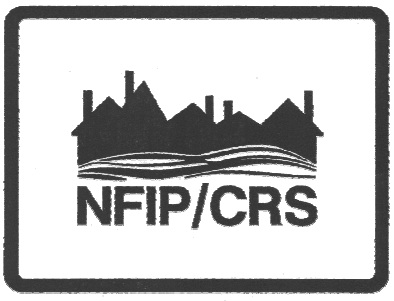
The multiple stream analyses resulted in the identification of flood prone areas or "damage reaches."

D R A F T

Flood Prone Buildings

The Federal Emergency Management Agency (FEMA) has identified 70 structures within Metro Nashville that have been paid two flood insurance claims of $1,000 or more within any 10-year period since 1978 (Table 4-18). These 70 "repetitive loss properties" have been flooded a total of 242 times, an average of 3.4 times each. In fact, one property on Browns Creek has filed 15 flood insurance claims since 1986; in other words, 15 claims in 16 years. These properties do not reflect the total number of homes that have flooded in Davidson County but rather the number of insured properties that have flooded more than once since 1976.

FEMA documents 2,785 flood insurance policies in Davidson County and has paid 886 flood insurance claims since Metro Nashville entered the flood insurance program in 1982. It is important to note that these statistics do not reflect the widespread flooding which occurred in Davidson County in 1973, 1975, and 1979 since Metro Nashville did not enter the National Flood Insurance Program until 1982. Countywide damage estimates for the 1979 flood alone were in excess of $40 million.



Repetitive loss areas have also been identified by Metro Nashville on twelve creeks (See Table 4-6). A repetitive loss area is an area that encompasses a repetitive loss property, identified by FEMA, plus all other properties in the immediate vicinity identified as being subject to a similar flood risk.

Table 4-6 Structures within the Repetitive Loss Areas

Repetitive Loss Area	Repetitive Loss Structures		Total Number of Properties
	Residential	Non-Residential	
Browns Creek	0	7	20
West & Middle Forks of Browns Creek	5	1	190
Buffalo Creek	1	0	13
Cumberland River	1	3	20
Dry Creek	1	1	31
Gibson Creek	1	0	40
McCrory Creek	6	0	105
Mill Creek	6	0	120
Sevenmile Creek	13	1	160
Sugartree Creek	8	1	45
Whittemore Branch	4	1	135
Whites Creek	1	0	90
Located Outside Major Creek Flooding	8	0	
TOTAL	**55**	**15**	**969**

(Source: Metropolitan Department of Public Works.)

D R A F T

FLOODING – WATERSHED SPECIFIC DATA

Browns Creek Watershed

The Browns Creek Watershed has a drainage area of 16.64 square miles and is located in south-central Davidson County. Browns Creek flows from south to north and discharges into the Cumberland River. West Fork and Middle Fork Browns Creek are major sub-basins located within the Browns Creek Watershed. West Fork combines with Middle Fork just upstream in the Interstate 440/Interstate 65 culvert.

The principal causes of flooding problems in the identified damage reaches are construction in the designated floodway and natural floodplain, and a lack of adequate stormwater controls in the developed areas upstream. Additional contributing factors include backwater flooding upstream from bridges. Flood magnitudes in the repetitive loss areas are not expected to increase significantly because the Browns Creek Watershed is nearly totally developed.

Damage Reaches

Eleven damage reaches have been identified on Browns Creek (see Appendix C, Figure C.1a). Flooding problems in these areas are due primarily to development and construction in the natural floodplain, which is very broad and flat, and development and construction in the floodway. Additionally, backwater is caused by multiple undersized bridges and culverts and aggravation, due to numerous large industrial and commercial buildings lining the creek bank, can severely constrict flood waters during major storm events. Table 4-7 provides specific damage information for each reach.

Damage Reach 1 extends from Murfreesboro Pike upstream to a point approximately .25 miles below Nolensville Pike. Damage Reach 2 extends from where Damage Reach 1 ends to Nolensville Pike. Damage Reach 3 begins at a point approximately one mile upstream of Nolensville Pike and extends for approximately 0.5 miles toward I-65.

Damage Reach 4 extends from the convergence of East Fork into Browns Creek upstream for approximately 0.5 miles on East Fork Browns Creek. Damage Reach 5 extends from Damage Reach 4 upstream to Woodmont Boulevard.

Damage Reach 6 covers the half-mile most downstream on Middle Fork Browns Creek. Damage Reach 7 is also on Middle Fork. It starts approximately 0.5 miles upstream of Woodmont Blvd. and extends upstream for approximately another 0.5 miles. Damage Reach 8 extends from Battery Lane downstream on Middle Fork approximately 0.5 miles. Damage Reach 9 extends from the ramp connecting the southwest corner of I-65 and I-440 upstream for almost 2 miles. Damage Reach 10 is upstream of Reach 9 and ends at a point approximately 1 mile downstream of Battery Lane. Damage Reach 11 extends approximately .75 miles both upstream and downstream of Battery Lane.

Table 4-7. Browns Creek - Damage Reach Information

Browns Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3	Damage Reach 4	Damage Reach 5	Damage Reach 6	Damage Reach 7	Damage Reach 8	Damage Reach 9	Damage Reach 10	Damage Reach 11
Buildings in floodplain		81	31	19	15	19	32	10	7	114	26	18
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		77	31	19	14	0	7	2	5	39	5	11
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		78	31	19	14	0	7	2	5	39	5	11
Homes located in the designated floodway		9	16 trailers 3 business buildings	0		0	3	3	0	20	7	7
Homes flooded at existing ***2-year*** flood level		3	2	9	11	0	2	0	4	4	2	1
Homes flooded at existing ***10-year*** flood level		22	10	18	13	0	6	2	5	16	4	4
Flood damages begin at a recurrence interval of (years)		< 2	< 2	< 2	< 2	0	< 2	3	<2	< 2	< 2	< 2
Types of buildings		Res, Ind and Comm	Res and Comm	Ind and Comm	Ind and Comm	Res	Res	Res	Res	Res	Res	Res
Average structural value (1990 dollars)		15K for Res	5K for the trailers	15K to 5 Mil	100K to 300K		57K	129K	51K	62K	63K	67K
Expected annual damages for ***existing*** conditions		333K	41K	743K	342K	$0.00	33K	19K	53K	104K	31K	32K
Expected annual damages for ***future*** conditions		424K	49K	868K	344K	$0.00	34K	21K	56K	110K	33K	35K

Repetitive Loss Areas

Currently, there are seven properties reporting repetitive losses due to flooding on Browns Creek and six properties on West Fork and Middle Fork Browns Creek (see Appendix C, Figures C.1b and C.1c). In addition, the associated repetitive loss areas encompass 20 properties on Browns Creek and 190 properties on West Fork and Middle Fork Browns Creek. The Browns Creek Storm Water Basin Plan, completed in 1990, identifies the flood-prone areas and alternative solutions to reduce flooding problems.

Cooper Creek Watershed

The Cooper Creek Watershed has a drainage area of 3.76 square miles and is located in north-central Davidson County. Cooper Creek flows from an elevation of approximately 495 feet in a southeasterly direction and to an elevation of 391 feet where it empties into the Cumberland River at river mile 197.3. The watershed is divided into three major basins named Upper, Dalewood, and Lower.

Damage Reaches

Three damage reaches have been identified on Cooper Creek (see Appendix C, Figure C.2). Flooding problems in these areas are primarily due to development and construction in the natural floodplain. Table 4-8 provides specific damage information for each reach. Damage Reach 1 extends from a point 728 feet below Ravenwood Drive (river mile 1.543) to a point 306 feet below McGavock Pike (river mile 1.917). Damage Reach 2 extends from a point just above McGavock Pike (river mile 1.988) to a point 1746 feet below Kennedy Avenue (river mile 2.204). Damage Reach 3 extends from a point at the upstream culvert at Kennedy Avenue (river mile 2.541) to a point 545 feet above Ardee Avenue (river mile 2.757).

Table 4-8. Cooper Creek - Damage Reach Information

Cooper Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3
Buildings in floodplain		29	10	13
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		20	6	8
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		20	6	8
Homes located in the designated floodway		n/a	n/a	n/a
Homes flooded at existing ***2-year*** flood level		n/a	n/a	n/a
Homes flooded at existing ***10-year*** flood level		n/a	n/a	n/a
Flood damages begin at a recurrence interval of (years)		8	n/a	n/a
Types of buildings		Res	Res	Res
Average structural value (1994 dollars)		46K	46K	46K
Expected annual damages for ***existing*** conditions		51K	8.4K	40K
Expected annual damages for ***future*** conditions		51K	8.4K	40K

Dry Creek Watershed

The Dry Creek Watershed has a drainage area of 9.2 square miles and is located in northeast Davidson County. Dry Creek flows from west to east and discharges into the Cumberland River.

A detailed analysis was performed on Dry Creek for approximately 2.65 river miles. Previous alternative analysis on Dry Creek by the USACE resulted in the elevation of several homes. The purpose of the project was to reduce flood damages within the Gateway Subdivision, located between I-65 and the Seaboard Systems Railroad. The project included a detention structure and flood proofing. The detention structure reduced flooding for all houses in the subdivision, with the exception of 19 structures whose first floor elevations remained below the 100-year flood elevation. The remaining 19 homes were raised between March 1989 and June 1990.

Repetitive Loss Areas

The current repetitive loss area is located downstream of this former project area along both the right and left banks of Dry Creek Mainstem between the Seaboard Systems Railroad and north Gallatin Pike (see Appendix C, Figure C.3). Flood damages within this area are attributable to rapid residential development without adequate stormwater controls in the upstream watershed areas combined with development along streams whose floodplain areas were not previously defined and regulated.

Currently, there are two properties reporting repetitive losses due to flooding on Dry Creek. In addition, the associated repetitive loss areas encompass 31 properties.

Gibson Creek Watershed

The Gibson Creek Watershed has a drainage area of 4.4 square miles and is located in northeast Davidson County. Gibson Creek flows from west to east and discharges into the Cumberland River. The repetitive loss area is located along Emmitt Avenue between the East Meade Avenue intersection and Walnut Street intersection, and along Denson Ave between Emmitt Avenue and Gibson Creek.

The principal causes of flooding problems within the repetitive loss area are construction in the designated floodways and natural floodplains, and lack of adequate stormwater controls in the developed areas. Additional contributing factors include backwater flooding from the Cumberland River and backwater flooding upstream from bridges and relatively narrow floodplains in the tributaries that cause rapid concentration of runoff with very little peak attenuation.

Damage Reaches

Four damage reaches have been identified on Gibson Creek (see Appendix C, Figure C.4a). Flooding problems in these areas are primarily due to development and construction in the natural floodplain. Table 4-9 provides specific damage information for each reach. Damage

Reach 1 on Gibson Creek mainstem extends from about 475 feet downstream of Gallatin Road at Stream Mile 0.85 and continues upstream past Gallatin Road approximately 1,125 feet to Stream Mile 1.13. Damage Reach 2 begins approximately 500 feet upstream of the confluence of Tributary No. 4 with Gibson Creak at Stream Mile 0.10 and extends up along Tributary No. 4 approximately 1,500 feet to Stream Mile 0.3. Damage Reach 3 begins at the upstream face of Idlewild Drive at Stream Mile 0.45 on Tributary No. 3 and extends 50 feet downstream of Harris Road to Stream Mile 0.73. Damage Reach 4 begins at the end of Damage Reach 3 on Tributary 3 and extends to a point approximately 150 feet upstream of Maple Street at Stream Mile 1.01.

Repetitive Loss Areas

Currently, there is one property reporting repetitive losses due to flooding on Gibson Creek (see Appendix C, Figure C.4b). In addition, forty properties are located within the associated repetitive loss areas. The Gibson Creek Storm Water Basin Plan, completed in 1996, identifies the repetitive loss area and alternative solutions to reduce existing flooding problems.

Table 4-9. Gibson Creek - Damage Reach Information

Gibson Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3	Damage Reach 4
Buildings in floodplain		10	7	37	41
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		8	4	10	19
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		9	5	10	19
Homes located in the designated floodway		0	0	0	5
Homes flooded at existing ***2-year*** flood level		4	0	1	9
Homes flooded at existing ***10-year*** flood level		8	1	6	15
Flood damages begin at a recurrence interval of (years)		n/a	n/a	2	1
Types of buildings		Res and Comm	Res	Res	Res
Average structural value (1994 dollars)		171K	n/a	42K	34K
Expected annual damages for ***existing*** conditions		173K	n/a	19K	60K
Expected annual damages for ***future*** conditions		n/a	n/a	19K	60K

Harpeth River Watershed - Buffalo Creek

The Buffalo Creek Basin has a drainage area of 5.59 square miles and is located in southwestern Davidson County. Buffalo Creek flows from east to west and discharges into the Harpeth River.

A detailed analysis was performed on Buffalo Creek as a part of the Flood Insurance Study for Metro Nashville in 1993. No additional basin plans or alternative analysis have been performed. Primarily a rural portion of the county, flood damages within this watershed are generally attributable to rapid residential development without adequate stormwater controls in the upstream watershed areas combined with development along streams whose floodplain areas were not previously defined and regulated.

Repetitive Loss Areas

The repetitive loss area is located at the confluence with the Harpeth River (see Appendix C, Figure C.5). Currently, there is one property reporting repetitive losses due to flooding on Buffalo Creek. In addition, the associated repetitive loss areas encompass thirteen properties.

Mill Creek Watershed

The Mill Creek Watershed has a drainage area of 72.3 square miles and is located in southeastern Davidson County. Mill Creek flows in a northerly direction and discharges into the Cumberland River.

Mill Creek flows through several miles of highly developed properties and, therefore, provides valuable green space to thousands of local residents. The stream's vegetated riparian zones provide a natural corridor for urban wildlife, shades the stream, and furnishes opportunities for scenic and recreational experiences in an urban setting.

The Mill Creek Watershed is experiencing intense pressure from adjacent and surrounding development. Surface runoff, point source pollution, riparian zone destruction, bank erosion, and floodplain encroachment are causing significant water quality deterioration and loss of natural floodplain functions and values. Future flooding conditions and stream ecological degradation will worsen as land development continues to stress Davidson County watersheds.

Damage Reaches

One damage reach has been identified on Tributary 1 of Mill Creek, and it extends from Rader Ridge Road upstream about 2060 feet from Stream Mile 1.31 to Stream Mile 1.70 on Tributary A (see Appendix C, Figure C.6a). Flooding problems in this area is due primarily to development in the natural floodplain. Delineation of the floodplain within the area is also a concern. Table 4-10 provides specific damage information for the damage reach.

Repetitive Loss Areas

The repetitive loss area is identified as the right bank of Mill Creek Mainstem extending approximately from Thompson Lane downstream to Murfreesboro Pike (see Appendix C, Figure C.6b). Currently, there are six properties reporting repetitive losses due to flooding on Mill Creek. In addition, the associated repetitive loss areas encompass 120 properties.

D R A F T

Table 4-10. Mill Creek Tributary 1 - Damage Reach Information

Mill Creek - Trib 1		Damage Reach
Buildings in floodplain		20
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		11
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		16
Homes located in the designated floodway		0
Homes flooded at existing ***2-year*** flood level		0
Homes flooded at existing ***10-year*** flood level		0
Flood damages begin at a recurrence interval of (years)		10
Types of buildings		Res
Average structural value (1993 dollars)		100K
Expected annual damages for ***existing*** conditions		12K
Expected annual damages for ***future*** conditions		17K

Mill Creek Watershed - Sevenmile Creek

Sevenmile Creek is located in southeastern Davidson County. It is the largest tributary to Mill Creek, having a drainage area of 17.7 square miles, with the confluence located immediately downstream of an Interstate 24 crossing. The stream flows through several miles of highly developed urban properties and provides valuable green space to thousands of local residents. Vegetated riparian zones provide a natural corridor for urban wildlife and birds, shades the stream, and furnishes opportunities for scenic and recreational experiences in an urban setting.

The principal causes of flooding problems in the repetitive loss areas are construction in the designated floodway and natural floodplain and a lack of adequate stormwater controls in the developed areas. Additional contributing factors include backwater flooding upstream from bridges, and relatively narrow floodplains in the tributaries that cause rapid concentration of runoff with very little peak attenuation. Without the use of stormwater controls, flood magnitudes in several of the flood prone areas are expected to increase significantly at predicted ultimate development conditions. There are several undeveloped areas in the watershed that have the potential to cause localized flooding once they are developed, if no stormwater controls are required.

Damage Reaches

Three damage reaches have been identified on Sevenmile Creek (see Appendix C, Figure C.7a). Damage Reach 1 is comprised of the residential area located between the railroad crossing over Sevenmile Creek at river mile 0.33 and Welch Road located at river mile 1.52.

Damage Reach 2 starts at Welch Road (river mile 1.53) and continues upstream through a residential area above Blackman Road and ends near Edmondson Pike and Brewer Drive at river mile 3.27. Damage Reach 3 starts near Edmondson Pike and Huntingdon Parkway at river mile 4.45 continuing to a private driveway at river mile 4.73 Table 4-11 provides specific damage information for the damage reach.

Repetitive Loss Areas

The repetitive loss area is located between Nolensville Pike and Briarwood Drive (see Appendix C, Figure C.7b). Currently, there are fourteen properties reporting repetitive losses due to flooding on Sevenmile Creek. In addition, the associated repetitive loss areas encompass 160 properties. The Sevenmile Creek Storm Water Basin Plan, completed in 2001, identifies these flood-prone areas and alternative solutions to reduce existing flooding problems.

Table 4-11. Sevenmile Creek - Damage Reach Information

Sevenmile Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3
Buildings in floodplain		160	171	6
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		n/a	n/a	n/a
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		139	158	1
Homes located in the designated floodway		n/a	n/a	n/a
Homes flooded at existing ***2-year*** flood level		1 (future)	4 (future)	0
Homes flooded at existing ***10-year*** flood level		20 (future)	42 (future)	0
Flood damages begin at a recurrence interval of (years)		< 2	< 2	>100
Types of buildings		Res	Res	Res
Average structural value (1999 dollars)		69.5K	123.5K	123K
Expected annual damages for ***existing*** conditions		n/a	n/a	n/a
Expected annual damages for ***future*** conditions		233K	394K	1K

Mill Creek Watershed – Sorghum Branch

The Mill Creek Sorghum Branch Watershed is located in southeast Davidson County and drains an area of 2.72 square miles. Stream flow within the watershed is generally in a northerly direction and empties into Mill Creek at Stream Mile 8.45 of Mill Creek. Maximum elevation at the upstream watershed divide reaches about 850 feet and drops to elevation 465 feet at the main stream confluence with Mill Creek. The Sorghum Branch watershed was divided into 14 sub-basins and is a relatively long and narrow watershed. Sorghum Branch is typified by narrow valleys with steep side slopes that transition into a rolling terrain on top of the ridges.

Damage Reaches

Two damage reaches have been identified on Sorghum Branch (see Appendix C, Figure C.8). Damage Reach 1 extends from Haywood Lane upstream about 950 feet from Stream Mile 2.12 to Stream Mile 2.30 on Sorghum Branch. Damage Reach 2 extends from a private drive to St. Basil's Church on Tusculum Road, upstream about 740 feet from Stream Mile 3.26 to Stream Mile 3.40. Flooding problems in these areas are primarily due to development and construction in the natural floodplain. Table 4-12 provides specific damage information for each reach.

Table 4-12. Sorghum Branch - Damage Reach Information

Sorghum Branch		Damage Reach 1	Damage Reach 2
Buildings in floodplain		23	8
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		5	3
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		5	3
Homes located in the designated floodway		1	0
Homes flooded at existing ***2-year*** flood level		n/a	n/a
Homes flooded at existing ***10-year*** flood level		3	2
Flood damages begin at a recurrence interval of (years)		<10	Oct-50
Types of buildings		Res	Res
Average structural value (1995 dollars)		69K	78K
Expected annual damages for ***existing*** conditions		36K	19K
Expected annual damages for ***future*** conditions		36K	19K

Mill Creek Watershed - Whittemore Branch

The Whittemore Branch Watershed has a drainage area of 3.7 square miles and is located in southeastern Davidson County. The mainstem flows in a northeasterly direction until its confluence with Mill Creek. The repetitive loss area extends from the upstream face of the bridge at Interstate 24 to the downstream face of the bridge at Bell Road.

The principal cause of flooding problems in the repetitive loss area is construction in the designated floodways and natural floodplains, in addition to the lack of adequate stormwater controls in the developed areas. Additional contributing factors include backwater flooding upstream from bridges, steep terrain, and relatively narrow floodplains in the tributaries that cause rapid concentration of runoff with little peak attenuation. Without the use of stormwater controls, flood magnitudes in the majority of the flood prone areas are expected to increase under predicted ultimate development conditions.

Damage Reaches

Four damage reaches have been identified on Whittemore Branch (see Appendix C, Figure C.9a). Damage Reach 1, on the Main Branch, extends from the upstream face of the bridge at Interstate 24 at river mile 0.445 to the downstream face of the bridge at Tusculum Road at river mile 0.987. Damage Reach 2, on the Main Branch, extends from a point 3,250 feet above the upstream face of the bridge at Tusculum Road at river mile 1.610 to the downstream face of the bridge at Bell Road at river mile 1.853. Damage Reach 3, on the Main Branch, extends from a point 125 feet below Cedarmont Drive at river mile 2.360 to a point 1710 feet above Cedarmont Drive (river mile 2.718). Damage Reach 4, on the West Branch of Whittemore Branch, extends from a point 200 feet above Tusculum Court at river mile 0.820 to the downstream face of the bridge at Ocala Circle at river mile 1.170. Flooding problems in these areas are due primarily to development and construction in the natural floodplain. Table 4-13 provides specific damage information for each reach.

Repetitive Loss Areas

Currently, there are five properties reporting repetitive losses due to flooding on Whittemore Branch (see Appendix C, Figure C.9b). In addition, the associated repetitive loss areas encompass 135 properties. The Whittemore Branch Storm Water Basin Plan, completed in 1996, identifies these flood-prone areas and alternative solutions to reduce existing flooding problems.

Table 4-13. Whittemore Branch - Damage Reach Information

Whittemore Branch		Damage Reach 1	Damage Reach 2	Damage Reach 3	Damage Reach 4
Buildings in floodplain		58	48	40	34
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		26	9	8	4
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		37	13	11	4
Homes located in the designated floodway		8	3	1	0
Homes flooded at existing ***2-year*** flood level		0	0	1	0
Homes flooded at existing ***10-year*** flood level		3	0	8	2
Flood damages begin at a recurrence interval of (years)		1	1	1	1
Types of buildings		Res	Res	Res	Res
Average structural value (1994 dollars)		70K	70K	70K	70K
Expected annual damages for ***existing*** conditions		69K	22K	59K	14K
Expected annual damages for ***future*** conditions		168K	53K	108K	19K

Homes are flooded at the existing conditions 10-year level and none at the 2-year level. However, analyses indicate flood damages begin at a recurrence interval of approcimately 1 year. This occurs because the damage assessment analysis model assigns damage beginning when flood waters reach eight feet below the first finished floor.

Pages Branch Watershed

The Pages Branch Watershed is located in north-central Davidson County. Pages Branch originates at an elevation of approximately 680 feet and flows in a southwesterly direction to an elevation of approximately 374 feet at its mouth. The watershed drains an area of 3.23 square miles and empties into the Cumberland River at river mile 188.5. The watershed is divided into 4 sub-basins – Upper, Dickerson, Middle, and Lower. Two major tributaries empty into Pages Branch Mainstem. The watershed is characterized by flat to gently rolling plains with scattered, steep-sided hills reaching elevations up to 810 feet. Floodplain areas throughout the watershed are typically narrow and steep except in the lower reaches of the mainstem where they are flat.

Damage Reaches

Five damage reaches have been identified on Pages Branch (see Appendix C, Figure C.10). Flooding problems in these areas are primarily due to development and construction in the natural floodplain. Damage Reach 1 is located on the mainstem of Pages Branch and extends from a point 27 feet above Old Trinity Lane at river mile 1.03 to a point 497 feet above Old Trinity Lane at river mile 1.12. Damage Reach 2 is located on the mainstem of Pages Branch and extends from a point 12 feet above Dickerson Pike at river mile 1.46 to a point 223 feet above Donald Street at river mile 1.87. Damage Reach 3 is located on the Upper Unnamed Tributary of Pages Branch and extends from a point 210 feet below Donald Street at river mile 0.09 to a point 590 feet below Dellway Avenue at river mile 0.33. Damage Reach 4 is located on the Upper Unnamed Tributary of Pages Branch and extends from a point 216 feet below Dellway Avenue at river mile 0.41 to a point 593 feet above Brunswick Drive at river mile 0.78. Damage Reach 5 is located on the Upper Unnamed Tributary of Pages Branch and extends from a point 391 feet below Jones Avenue at river mile 0.88 to a point 499 feet above Jones Avenue at river mile 1.02. Table 4-14 provides specific damage information for each reach.

Table 4-14. Pages Branch - Damage Reach Information

Pages Branch		Damage Reach 1	Damage Reach 2	Damage Reach 3	Damage Reach 4	Damage Reach 5
Buildings in floodplain		23	14	11	15	15
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		6	4	7	9	7
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		7	5	7	9	9
Homes located in the designated floodway		2	3	4	6	3
Homes flooded at existing ***2-year*** flood level		0	1	2	4	6
Homes flooded at existing ***10-year*** flood level		0	2	2	8	6
Flood damages begin at a recurrence interval of (years)		12	< 2	< 2	< 2	< 2
Types of buildings		Res	Res	Res	Res	Res
Average structural value (1990 dollars)		15K	25K	26K	24K	27K
Expected annual damages for ***existing*** conditions		1K	7K	11K	21K	27K
Expected annual damages for ***future*** conditions		1K	7K	13K	29K	32K

Richland Creek Watershed

The Richland Creek Watershed is located in southwestern Davidson County. Richland Creek originates at an elevation of approximately 1,100 feet and flows in a north to northwesterly direction to an elevation of approximately 375 feet at its mouth. The watershed drains an area of 28.45 square miles and empties into the Cumberland River at river mile 175.6. The watershed is divided into 6 major sub-basins – Belle Meade, Vaughns Gap, Jocelyn Hollow, Sugartree, Middle, and Lower. There are five major tributaries that empty into Richland Creek Mainstem – Unnamed Tributary, Sugartree Creek, Jocelyn Hollow Branch, Vaughns Gap Branch, and Belle Meade Branch.

The watershed is characterized by rugged topography in the southern portion and flat to gently sloping plains with local hills reaching between 300-800 feet in the central and northern portions. Richland Creek and its tributaries flow through predominately urban settings.

Damage Reaches

Nine damage reaches have been identified on Richland Creek (see Appendix C, Figure C.11). Flooding problems in these areas are due to development and construction in the natural floodplain, aggravation due to upstream and local urbanization, and backwater created from multiple undersized bridges/culverts. Table 4-15 provides specific damage information for each reach.

Damage Reaches 1 and 2 are located on Richland Creek Mainstem. Damage Reach 1 extends from 495 feet downstream from Briley Parkway to 3,240 feet upstream from Charlotte Pike. Damage Reach 2 is located between the upstream side of Bosley Springs Road and 120 feet upstream from Harding Place.

Damage Reaches 3 and 4 are located on Unnamed Tributary to Richland Creek. Damage Reach 3 extends from 325 feet upstream of Montgomery Bell Academy to 185 feet downstream of Bowling Avenue.

Damage Reaches 5 and 6 are located on Sugartree Creek. Damage Reach 5 extends from 1140 feet downstream of Valley Forge Drive to a point 625 feet upstream of Estes Road. Damage Reach 6 is located between the upstream end of Damage Reach 5 and 280 feet downstream from Hillsboro Pike.

Damage Reach 7 is located on Jocelyn Hollow Branch and extends from 116 feet upstream of the Seaboard Systems Railroad to a point 501 feet upstream of Sedberry Road. Damage Reach 8 is located on Vaughns Gap Branch and extends from the upstream side of the Memphis-Bristol Highway to a point 1025 feet downstream from Park Lane. Damage Reach 9 is located on Belle Meade Branch and extends from 622 feet downstream from Forsythe Place to 70 feet upstream from Warner Place.

Table 4-15. Richland Creek - Damage Reach Information

Richland Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3	Damage Reach 4	Damage Reach 5	Damage Reach 6	Damage Reach 7	Damage Reach 8 Vaughn's Gap Branch	Damage Reach 9
Buildings in floodplain		332	55	45	12	82	61	17	46	9
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		201	31	29	7	61	42	7	23	6
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		232	34	32	9	61	42	7	23	6
Homes located in the designated floodway		81	4	10	2	25	12	2	12	2
Homes flooded at existing ***2-year*** flood level		28	5	19	2	7	20	1	3	2
Homes flooded at existing ***10-year*** flood level		81	13	24	6	32	35	4	10	3
Flood damages begin at a recurrence interval of (years)		< 2	<1	<1	< 2	<1	< 1	< 1	< 1	< 1
Types of buildings		Res	Res and Comm	Res	Res	Res	Res	Res	Res	Res
Average structural value (1989 dollars)		40K	70K	40K	60k	68K	68K	70K	60K	100K
Expected annual damages for ***existing*** conditions		404K	114K	452K	36K	242K	485K	32K	53K	38K
Expected annual damages for ***future*** conditions		531K	149K	559K	147K	265K	502K	36K	60K	41K

D R A F T

Richland Creek Watershed - Sugartree Creek

Sugartree Creek, a major tributary of Richland Creek, is located in southwestern Davidson County. The Sugartree Creek basin has a drainage area of 4.91 square miles and Sugartree Creek flows northwest and combines with Richland Creek downstream of West End Avenue. Sugartree Creek flows through predominantly urban settings. The repetitive loss area is located on both sides of Sugartree Creek along Dartmouth Avenue extending from the cul-de-sac of Wimbledon Road downstream to Woodmont Lane, with additional areas located downstream to Revere Private Road.

Repetitive Loss Areas

The principal causes of flooding in the repetitive loss area are construction in the designated floodways and natural floodplains and lack of adequate stormwater controls in the developed areas. Additional contributing factors include backwater flooding upstream from bridges and steep terrain and relatively narrow floodplains that cause rapid concentration of runoff with very little peak attenuation. Flood magnitudes in the repetitive loss areas are not expected to increase significantly at predicted ultimate development conditions compared to the level of existing urban development.

Currently, there are nine properties reporting repetitive losses due to flooding on Sugartree Creek. In addition, the associated repetitive loss areas encompass 45 properties (see Appendix C, Figure C.12). The Richland Creek Storm Water Basin Plan, completed in 1990, identifies these flood-prone areas and alternative solutions to alleviate existing flooding problems.

Stones River Watershed – East Fork Hamilton Creek

The Stones River Watershed is located in southeast Davidson County. East Fork Hamilton Creek originates at an elevation of approximately 735 feet and flows in a northerly direction to an elevation of approximately 485 feet at Percy Priest Lake. The watershed drains an area of 3.45 square miles and empties into Percy Priest Lake near Smith Springs Road. The watershed is divided into 4 main basins – Upper, Lower, Rural Hill, and Bluewater – and there are two main unnamed tributaries. The watershed is characterized by flat to gently rolling plains and scattered, gently sloping hills reaching elevations up to 735 feet. Floodplain areas throughout the watershed are typically wide and flat, except in the upper reaches of the tributaries, where they are steep.

Damage Reaches

Six damage reaches have been identified on East Fork Hamilton Creek (see Appendix C, Figure C.13). Flooding problems in these areas are primarily due to development in the natural floodplain. Damage Reach 1 extends from a point at the upstream face of the bridge at Smith Springs Road at river mile 2.83 to a point 1,470 feet below Mossdale Drive at river mile 3.33. From here to a point 50 feet below Mossdale Drive at river mile 3.60 is defined as Damage Reach 2. Damage Reach 3 extends from the bridge at Mossdale Drive at river mile

3.62 to a point 680 feet below Bell Road at river mile 4.21. Damage Reach 4 is on the Upper Unnamed Tributary to East Fork Hamilton Creek and extends from a point at the downstream face of the bridge at Mossdale Drive at river mile 0.14 to a point 45 feet below Anderson Road at river mile 0.47. Damage Reach 5 is on the Upper Unnamed Tributary to East Fork Hamilton Creek and extends from the bridge at Anderson Road at river mile 0.49 to a point 847 feet below Hamilton Church Road at river mile 0.99. Damage Reach 6 is on the Lower Unnamed Tributary to East Fork Hamilton Creek and extends from a point 780 feet above Butler Road at river mile 0.34 to a point 2035 feet above Butler Road at river mile 0.58. Table 4-16 provides specific damage information for each reach.

Table 4-16. East Fork Hamilton Creek - Damage Reach Information

East Fork Hamilton Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3	Damage Reach 4	Damage Reach 5	Damage Reach 6
Buildings in floodplain		32	46	61	57	79	44
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		17	12	11	2	11	8
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		18		13	7	25	8
Homes located in the designated floodway		0	1	1	1	0	0
Homes flooded at existing ***2-year*** flood level		0	1	2	0	0	4
Homes flooded at existing ***10-year*** flood level		0	5	2	0	0	
Flood damages begin at a recurrence interval of (years)		50	< 2	2	15	15	< 2
Types of buildings		Res	Res	Res	Res	Res	Res
Average structural value (1990 dollars)		60K	60K	60K	60K	60K	60K
Expected annual damages for ***existing*** conditions		4K	24K	15K	3K	5K	26K
Expected annual damages for ***future*** conditions		4K	31K	18K	5K	19K	29K

Stones River Watershed - McCrory Creek

The McCrory Creek Watershed has a drainage area of 9.31 square miles and is located in southeastern Davidson County. McCrory Creek flows north and discharges into the Stones River. The repetitive loss area is located on McCrory Creek Mainstem immediately downstream from Interstate 40 and extending from Elm Hill Pike to Stewart's Ferry Pike. These reaches encompass older and more established neighborhoods with a long history of flooding problems.

Flood damages within this watershed are generally due to rapid residential development without adequate stormwater controls in the upstream watershed areas combined with development along streams whose floodplain areas were not previously defined and regulated. Additional contributing factors include coincident peak flows from two-sub-basins within the watershed having approximately equal times-of-concentration located immediately upstream

from the flood-prone areas, and steep terrain and narrow floodplains which cause a rapid concentration of runoff with very little peak attenuations.

Repetitive Loss Areas

Currently, there are six properties reporting repetitive losses due to flooding on McCrory Creek (see Appendix C, Figure C.14). In addition, the associated repetitive loss area encompasses 105 properties. The McCrory Creek Storm Water Basin Plan, completed in 1988, identifies this flood-prone area and alternative solutions to reduce existing flooding problems.

Stones River Watershed - Scotts Creek

The Scotts Creek watershed has a drainage area of 3.39 square miles and is located in northeast Davidson County. Scotts Creek flows from north to south and empties into Stoner Creek at river mile 4.1. The watershed is divided into 19 sub-basins. Scotts Creek originates at an elevation of 600 feet and flows south to an elevation of 435 feet at its mouth. The watershed is characterized by flat to gently rolling plains with scattered, steep-sided hills reaching elevations of up to 600 feet. Floodplain areas throughout the watershed are typically narrow and steep, except in the lower reaches of the mainstream where they are flat and sometimes wide. There are two tributaries that flow into Scotts Creek at Stream Mile 0.9 (Tributary No. 2) and Stream Mile 0.21 (Tributary No. 3).

Damage Reaches

Three damage reaches have been identified on Scotts Creek (see Appendix C, Figure C.15). Flooding problems in these areas are attributable to development in the natural floodplain. Damage Reach 1 begins 1000 feet south of Lebanon Road at Stream Mile 0.75 and continues upstream along Scotts Creek mainstem 900 feet to Stream Mile 0.92. Damage Reach 2 begins 300 feet north of Lebanon Road at Stream Mile 0.17 and continues upstream 1,700 feet along Tributary No. 2 to Stream Mile 0.49. Damage Reach 3 begins on Tributary No. 3 at Stream Mile 0.26 and extends upstream along Tributary No. 3 to Stream Mile 0.58. Table 4-17 provides specific damage information for each reach.

D R A F T

Table 4-17. Scotts Creek - Damage Reach Information

Scott's Creek		Damage Reach 1	Damage Reach 2	Damage Reach 3
Buildings in floodplain		16	17	18
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		2	13	9
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		10	14	14
Homes located in the designated floodway		n/a	n/a	n/a
Homes flooded at existing ***2-year*** flood level		0	3	2
Homes flooded at existing ***10-year*** flood level		0	9	9
Flood damages begin at a recurrence interval of (years)		100	2	1
Types of buildings		res	res	res
Average structural value (1997 dollars)		41K	60K	51K
Expected annual damages for ***existing*** conditions		1K	64K	33K
Expected annual damages for ***future*** conditions		9K	100K	67K

Whites Creek Watershed

The Whites Creek Watershed has a drainage area of 63.8 square miles and is located in north-central Davidson County. Whites Creek flows south and discharges into the Cumberland River.

The repetitive loss area is located on the right bank of Whites Creek Mainstem extending from Knight Road downstream to Clarksville Pike. Flood damages within this repetitive loss area are due to construction in the natural floodplain. Flood damages have been aggravated by upstream and local urbanization, and backwater from several bridges.

Damage Reaches

Sixteen damage reaches have been identified on Whites Creek (see Appendix C, Figure C.16a). Flooding problems in these areas can be attributed to development and construction in the natural floodplain, aggravation caused by upstream and local urbanization, and backwater from multiple undersized bridges and culverts. However, flooding problems in these areas have also been eased by headwater detention and floodplain storage behind Interstate embankments. Table 4-18 provides specific damage information for each reach.

Damage Reaches 1, 2, and 3 are located on Whites Creek Mainstem. Damage Reach 1 extends from the upstream side of the bridge at Hydes Ferry Pike at river mile 3.34 to the confluence of Whites Creek Mainstem and Ewing Creek Mainstem at river mile 6.1. Damage Reach 2 is located between the confluence of Whites Creek Mainstem and Ewing Creek Mainstem at river mile 6.1 and the downstream side of the bridge at Knight Road at river mile

9.09. Damage Reach 3 extends from the upstream side of the bridge at Knight Road at river mile 9.09 to the confluence of Whites Creek Mainstem and Crocker Springs Branch at river mile 12.29.

Damage Reaches 4, 5, 6, and 7 are located on Ewing Creek Mainstem. Damage Reach 4 is located between the upstream side of the bridge at Whites Creek Pike at river mile 0.79 and the downstream side of the bridge at Gwynnwood Drive at river mile 2.06. Damage Reach 5 extends from the upstream side of the bridge at Gwynnwood Drive at river mile 2.07 to the downstream side of Interstate 24 at river mile 2.47. Damage Reach 6 is located between the upstream side of Interstate 24 at river mile 2.55 and the downstream side of Interstate 65 at river mile 3.35. Damage Reach 7 extends from the upstream side of Interstate 65 at river mile 3.4 to the downstream side of Dickerson Pike at river mile 4.01.

Damage Reaches 8 and 9 are located on North Fork Ewing Creek. Damage Reach 8 extends from the upstream side of Interstate 24 at river mile 0.26 to the downstream side of the bridge at Brick Chruch Pike at river mile 1.34. Damage Reach 9 is located between the upstream side of the bridge at Brick Church Pike at river mile 1.34 and the downstream side of Dickerson Pike at river mile 2.90.

Damage Reach 10 is located on Eaton Creek and encompasses the entire 3.19 miles studied. Damage Reach 11 is located on Little Creek and extends from its confluence with Whites Creek Mainstem to approximately 0.5 miles upstream of Old Hickory Boulevard at river mile 2.96. Damage Reach 12 is located on Drake Branch and extends from its confluence with Whites Creek Mainstem to river mile 1.0. Damage Reach 13 is located on Earthman Fork and extends from downstream of the bridge at Whites Creek Pike at river mile 0.21 to approximately 1.80 miles upstream of the bridge at Old Hickroy Boulevard at river mile 2.2. Damage Reach 14 is located on Dry Frok and extends from its confluence with Whites Creek Mainstem to downstream of Waller Road at river mile 1.71. Damage Reach 15 is located on an unnamed tributary of Whites Creek Mainstem just south of the Whites Creek Mainstem and Ewing Creek Mainstem confluence. This damage reach extends from the downstream side of Crouch Drive at river mile 0.10 to approximately 0.26 miles upstream of the bridge at Rowan Drive. Finally, Damage Reach 16 is located on an unnamed tributary to Ewing Creek Mainstem between Interstates 24 and 65. This damage reach extends from its confluence with Ewing Creek Mainstem to approximately 0.13 miles upstream of the bridge at Spears Road.

Repetitive Loss Areas

Currently, one property is reporting repetitive losses due to flooding on Whites Creek. In addition, the associated repetitive loss areas encompass ninety properties (see Appendix C, Figure C.16b). The Whites Creek Storm Water Basin Plan, completed in 1988, identifies these flood-prone areas and alternative solutions to reduce existing flooding problems.

Table 4-18. Whites Creek - Damage Reach Information

Whites Creek		Damage Reach 1 and 2	Damage Reach 3	Damage Reach 4, 5, 6, and 7	Damage Reach 8 and 9	Damage Reach 10	Damage Reach 11	Damage Reach 12	Damage Reach 13	Damage Reach 14	Damage Reach 15	Damage Reach 16
Buildings in floodplain		364	17	232	69	31	15	41	20	7	45	33
Buildings that have first floor living spaces that are inundated at the ***existing*** conditions 100-year flood level		181	6	63	12	8	6	6	6	0	4	1
Buildings that have first floor living spaces that are inundated at the ***future*** conditions 100-year flood level		237	8	81	13	9	7	11	8	1	4	2
Homes located in the designated floodway		44	6	44					1	0	0	
Homes flooded at existing ***2-year*** flood level		0	2	4	0	0	2	0	4	0	0	0
Homes flooded at existing ***10-year*** flood level		13	5	22	3	3	5	4		0	0	0
Flood damages begin at a recurrence interval of (years)		2.2	< 1	< 1	2.1	4	1.2	2.1	< 1	100	25	83
Types of buildings		Res	Res	Res	Res	Res	Res	Res	Res	Res	Res	Res
Average structural value (1988 dollars)		48K	51K	57.5K	57.5K	57.5K	45K	45K	45K	45K	57.5K	57.5K
Expected annual damages for ***existing*** conditions		100K	102K	386K	16K	8K	24K	7K	74K	0	2K	$200.00
Expected annual damages for ***future*** conditions		236K	117K	539K	22K	16K	69K	13K	91K	0	3K	$600.00

D R A F T

Cumberland River

The Cumberland River is a major tributary of the Ohio River. It originates at the confluence of Poor and Clover Forks near the City of Harlan, Kentucky. The 694-mile river flows generally southwest to Nashville where it turns and flows northwest into western Kentucky and its confluence with the Ohio River. The Cumberland River Watershed has a drainage area of 17,914 square miles, with approximately 12,841 square miles located upstream of Metro Nashville.

Repetitive Loss Areas

A repetitive loss area is identified downstream of river mile 175, in the Cockrill Bend area (see Appendix C, Figure C.17). Several upstream control reservoirs provide the majority of flood damage abatement. However, in the repetitive loss area, flood problems are caused by the confluence of Overall Creek with the Cumberland River and inadequate stormwater controls on Overall Creek.

Currently, there are four properties reporting repetitive losses due to flooding on the Cumberland River. The associated repetitive loss areas encompass 20 properties

Past Occurrences

There have been 60 recorded flood events in Davidson County by the National Climatic Data Center since 1950. These events are presented in Appendix B.

Likelihood of Future Occurrences

The terms "10 year", "50 year", "100 year" and "500 year" floods are used to describe the estimated probability of a flood event happening in any given year. A 10 year flood has a 10 percent probability of occurring in any given year, a 50 year event a 2% probability, a 100 year event a 1% probability, and a 500 year event a 0.2% probability. While unlikely, it is possible to have two 100 or even 500 year floods within years or months of each other.

The potential for flooding can change and increase through various land use changes and changes to land surface. A change in environment can create localized flooding problems inside and outside of natural floodplains through the alteration or confinement of natural drainage channels. These changes can be created by human activities or by other events, such as wildfires, earthquakes, or landslides.